09/708,083

WEST Search History

DATE: Wednesday, March 26, 2003

Set Name	Query	Hit Count	Set Name
side by side			result set
	DB=USPT; PLUR=NO; OP=ADJ		
L22	l6 and HTML and l9 and l4	1	L22
L21	l3 and l6 and l7	3	L21
L20	l3 and l10	0	L20
L19	L18 and l3	1	L19
L18	image$1 same HTML same tag$1	417	L18
L17	l5 and (l6 or l12 or l9)	28	L17
L16	l5 and l6 and l12	0	L16
L15	l5 and l7 and (l8 or l9)	3	L15
L14	l5 and (l7 same l8)	0	L14
L13	l5 and l6 and l7	3	L13
L12	multi-leveled	122	L12
L11	multi-leveled adj1 retrieval	0	L11
L10	order same precedence same evaluating	3	L10
L9	(evaluating or ranking or weighting).ab.	7219	L9
L8	evaluating or ranking or weighting	93041	L8
L7	(tag$1 or tagged) near4 image$1	1308	L7
L6	retrieving near3 image$1	1744	L6
L5	L4 and l3	60	L5
L4	(707/1 OR 707/3 OR 707/5 OR 707/104.1 OR 382/305).CCLS.	4882	L4
L3	l1 or l2	99	L3
L2	(5832474 or 6012069 or 6044365 or 6212527 or 6212527 or 6138149 or 5684999 or 6243501 or 5381158 or 5579471 or 5751286 or 5761655 or 5821929 or 5428774 or 5983237 or 5748805 or 5895464 or 6233547 or 4999790 or 5598557 or 5734893 or 5805746 or 5819288 or 5832499 or 5832495 or 5852823 or 5899999 or 5940824 or 5953451 or 5995978 or 6021231 or 6067539 or 6092080 or 6192151 or 5649188 or 6070161 or 5020019 or 5515488 or 5931907 or 4852019 or 5276866 or 5886698 or 5982369 or 5661823 or 5877756 or 6020982 or 6049342 or 6295139 or 5694580 or 5553281).pn.	49	L2
L1	(5911139 or 5913205 or 5915250 or 5179649 or 5893095 or 6072904 or 5521841 or 5557728 or 5715442 or 6178417 or 6128102 or 5608859 or 5347623 or 5950196 or 6181817 or 5732227 or 5917490 or 6438233 or 5361204 or 5649191 or 5679939 or 5799115 or 5815704 or 5973680 or 6085185 or 6175828 or 5742808 or 5892843 or 6247031 or 4985863 or 5367672 or 5369742 or 5572726 or 5625810 or 5943443 or 5945982 or 6006226 or 6104500 or 6243713 or 5899989 or 4972349 or 5970486 or 6212521 or 4554631 or 5937422 or 5301315 or 5481704 or 5535382 or	50	L1

5809471 or 5873107).pn.

END OF SEARCH HISTORY

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L10: Entry 1 of 3   File: USPT   Sep 1, 1998

DOCUMENT-IDENTIFIER: US 5802361 A
TITLE: Method and system for searching graphic images and videos

Detailed Description Text (69):
If there is no express precedence in the search inquiry, the side information files
115 are evaluated based on statistics built up by the system 100 on the optimal term
evaluation strategy in the past. Alternatively, the side information files 115 may be
analyzed based on the computational requirements associated with each type of side
information file, with less computationally intensive side information files being
evaluated first. Other considerations may also used to determine the order of
evaluation of the image attributes and side information files 115 such as evaluating
color image attributes prior to texture or motion, or evaluating text image attributes
before all others. These orderings are used to improve performance by evaluating those
image attributes that have either the greatest immediate semantic value and likeliness
of accurate reflection of the user's intended meaning for the search query, or that
require the least amount of computational power to evaluate, thus leaving those
attributes that take more computational resources for evaluation over the smallest
potential search spaces. Thus, in the prior example, the color histogram side
information file would be evaluated first, and all images containing
color(H[150.degree.,245.degree.]; S[0.05, 0.70]) would be identified, since color is a
very strong indicator of a correct match of a "blue sky" (where this is the hue and
saturation setting for the color of a blue sky) and a user is most likely to
accurately specify the color of a "blue sky" when constructing the search inquiry.

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L13: Entry 1 of 3　　　　　　　　　File: USPT　　　　　　　　Jun 2, 1998

DOCUMENT-IDENTIFIER: US 5761655 A
TITLE: Image file storage and retrieval system

US PATENT NO. (1):
5761655

Brief Summary Text (5):
The present invention is directed to methods and apparatus for creating and retrieving image data files in a computer system and, more particularly, to a system in which tens of thousands or even hundreds of thousands of files must be created and searched for retrieval, where the file retrieval process requires narrowing the number of files presented to the user and manually choosing the desired files out of the set presented and where selection can be by many different kinds of similarities thereby providing multi-dimensional organization of the files and also allowing the organization of many storage devices integrated with media autochangers to automatically bring off line files on line for access.

Brief Summary Text (13):
Conventional programs designed specifically for organizing images provide the same selection ability but typically save the thumbnails for each newly encountered image file in a master database or append the thumbnails to the actual file itself. This allows more efficient presentation of images in the future, also organizers will often allow keywords to be assigned to files or groups of files. These keywords can then be used to select a smaller group (i.e. only those tagged with the given keywords) of images from which to select. This is very important when a large number of images are being stored. Existing programs using this method of image selection are Curator by Solutions International.

Brief Summary Text (20):
It is an additional object of the present invention to allow selection of those image files matching m out of n selected keywords including super-keywords allowing for a fudge-factor where some relevant images may not be tagged with all selected keywords and where super-keywords are actually entire templates of selection criteria which have been assigned a keyword name.

Current US Cross Reference Classification (1):
707/3

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L13: Entry 2 of 3   File: USPT   May 12, 1998

DOCUMENT-IDENTIFIER: US 5751286 A
TITLE: Image query system and method

US PATENT NO. (1):
5751286

Abstract Text (1):
Images in an image database are searched in response to queries which include the
visual characteristics of the images such as colors, textures, shapes, and sizes, as
well as by textual tags appended to the images. Queries are constructed in an image
query construction area in response to values of representations of the visual
characteristics and to locations of the representations in the image query
construction area.

Brief Summary Text (12):
A more sophisticated method for retrieving images similar to a given image is given in
Mikihiro Ioka. "A Method of Defining the Similarity of Images on the Basis of Color
Information", Technical Resort RT-0030, IBM Tokyo Research Lab, 1989. Here, each image
in the database (actually, the subimage of each image containing a single, dominant
object the image) is partitioned into blocks, for example. 25 blocks. Within each
block, the reduced bucket histogram,h, (say, 256 buckets) is computed. Given a query
image or object, is also partitioned into the same number of blocks and the histograms
computed. A similarity measure s(h.sub.query.sbsb.---.sub.image
h.sub.database.sbsb.---.sub.item) is defined on the color histograms computed in the
blocks, and the measure is extended to images as:

Brief Summary Text (16):
The general problem solved by this invention is that of retrieving images from an
online image database. Standard methods use image identifiers and/or -text or keywords
associated with each image. Other approaches, such as those described in the prior
art, use the colors that appear in the images.

Detailed Description Text (23):
In the first embodiment of the invention, four selection windows (containers) are
employed: a color container 91, a texture container 92, a shape container 93, and a
category container 94. The containers 91, 92 and 93 correspond to characteristics
which are innate in an image and which can be calculated as described above from image
content. The category characteristic is an arbitrary textual tag which can be appended
to an image or an image mask. Each of the selection containers 91-94 contains one or
more icons, which are referred to, preferably, as "thumbnails". Each thumbnail in one
of the image characteristic containers 91, 92 and 93 corresponds to a prespecified
value for an image characteristic. For example, the "RED" thumbnail 96 in the color
selection container 91 corresponds to a precalculated value for red taking into
account all the components of a particular display scheme which contribute to the
particular shade of red given by the thumbnail 96. In the texture selection container
92, the "GRASS" thumbnail 97 corresponds to a set of precalculated textural values. In
the shape selection container 93, the "TRIANGLE" thumbnail 98 corresponds to a
quantized representation of a triangle.

Current US Cross Reference Classification (5):
382/305

Other Reference Publication (31):

M. Kurokawa, "An Approach to <u>Retrieving Images</u> by Using their Pictorial Features", IBM Research, Japan, Sep. 1989.

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DOCUMENT-IDENTIFIER: US 6243713 B1
TITLE: Multimedia document retrieval by application of multimedia queries to a unified
index of multimedia data for a plurality of multimedia data types

US PATENT NO. (1):
6243713

Brief Summary Text (20):
The various tokens resulting from the component processing are all stored in the
unified multimedia index, even though they represent different types of multimedia
data. Thus, text, image, audio, and video, and other tokens are all combined into the
same index, thereby facilitating robust retrieval, cross-media relevancy ranking, and
sharing of indexing, search, and retrieval modules. In a preferred embodiment, the
multimedia index is an inverted index with each token, regardless of its type,
associated with a set of documents containing the data which the token represents.
Each of these indexed documents in turn contains a list with the position of each
occurrence of the token in the document, and the reference data for the occurrence of
the token.

Brief Summary Text (22):
A preferred embodiment for processing the queries uses a coarse and fine-grain scoring
of documents, but with the same query. Coarse-grain scoring evaluates the query with
respect to only whether a document includes or does not include tokens of the query,
essentially a Boolean analysis. Fine-grain ranking uses proximity operators to compare
positional information for the tokens, and to compare underlying reference data
between query tokens and document tokens.

Detailed Description Text (4):
The inputs to the indexing pipeline 192 are multimedia, or compound documents
containing various types of multimedia components (though of course the present
invention may be used to index documents that have only text, as well as images,
videos, or audio recordings by themselves). A compound document may be structured in
one of two ways: 1) the multimedia components are specified by reference, or; 2) the
multimedia components are embedded directly in the data of the document. An example of
the first structure are HTML documents, which incorporate external files by reference.
For example, an image may be incorporated with the HTML tag <IMG SRC>, such as in <IMG
SRC="http:/abc/image.gif">.

Detailed Description Text (11):
From the generated query components, including additional components from query
expansion 180, the retrieval pipeline creates 190 a query structure that organizes the
selected tokens along with search operators into an expression that can be used to
evaluate or score individual compound documents. This query structure is then
processed 200 against the multimedia index 140 to select and score a number of
compound documents that satisfy the query. In a preferred embodiment, the selection of
documents involves two levels of relevancy scoring. Coarse-grain relevancy scoring is
used to select an initial set of candidate documents by evaluating the query structure
using data indicative of whether a document contains the query tokens. With the
smaller candidate set, a fine-grain relevancy scoring uses the reference data of the
tokens to evaluate both proximity operators, and similarity operators. The best
scoring documents from the candidate documents form the search results.

Detailed Description Text (28):

As an example of component tags, in an RTF document image components start with
"{.backslash.pict" and end with "}". In HTML documents, images start with "<IMG SRC="
and end in ">". Searching 504, 506 for component tags may involve recognizing tags
regardless of embedded spaces or mixed upper/lower case.

Detailed Description Text (36):
The tokens are then further filtered and normalized 630, for example, eliminating
tokens for less significant data (e.g. helping verbs, or infrequently appearing color
tokens). For each of the remaining tokens, the position of the token within the
multimedia component or the document itself is determined 640. This information is
useful to perform true proximity searching of tokens, particularly of tokens for
different types of multimedia components, and relevancy ranking of documents. In
addition to relevancy ranking, the document position may also be used for document
highlighting (i.e. identifying in the retrieval user interface the parts of a
multimedia document which were matched to the user's query).

Detailed Description Text (37):
Finally, each token created may have computed 650 for it an arbitrary amount of
"reference data". Reference data typically identifies the position of the token within
the multimedia document, plus any additional data required for fine-grain relevancy
ranking for the object (usually determined by the type of the object). This additional
data is again dependent on the type of the multimedia component.

Detailed Description Text (192):
Searching is broken into three major stages: Coarse-grain searching 1402, fine-grain
searching 1402, and final scoring 1406. This division is done primarily for
performance reasons. While it is certainly possible to do fine-grain relevancy ranking
on all documents in a database, such a method would be very slow.

Detailed Description Text (193):
Coarse-grain searching 1402 is an initial relevancy ranking stage used to identify a
"rich subset" of documents that likely satisfy the user's query. Coarse-grain
searching 1402 generally considers the existence or absence of tokens in a document
when computing the value of the query structure for a document. Thus, as noted above,
a query token receives a token value of 1.0 if it is present in the document, and a
token value of 0.0 if it is absent. The only data required for this computation is the
list of documents 904 which contain each token. For each document, the query structure
is computed. This gives the coarse-grain score for each document. The result is a
candidate document list 1412.

Detailed Description Text (202):
Once the computations are finished, a set 1412 of the best documents are selected 1508
as the candidate documents to fine-grain searching 1404. The number of candidate
documents selected can be specified by the user as either an absolute number, or as a
threshold based on the coarse-grain relevancy ranking score, or other filtering means.

Detailed Description Text (227):
These scores are combined 1520 in a linear equation to produce the final relevancy
score for the document. The constants of the linear equation can be determined through
a statistical regression analysis by executing, for example, 50 queries and evaluating
the top 200 documents for each. One preferred embodiment uses a formula such as
A*(NUM_HITS/NUM_WORDS)+B*MAX_HIT+C*COARSE_RANK, where A, B, and C are adjusted to
balance the saliency of these different factors, based on analysis of the document
set. This formula may also be adjusted for small documents, for example to have
NUM_WORDS set to 100 for documents which have fewer than 100 words, or some other
constant. Obviously, different scoring equations with different constants may be used.

Current US Original Classification (1):
707/104.1

Current US Cross Reference Classification (3):
707/3

Other Reference Publication (17):
Lu, Z., Callan, J.P., Croft, W.B., "Measures in Collection Ranking Evaluation,"
University of Massachusetts, Technical Report TR96-39, 1996.

CLAIMS:

30. A computer implemented method for retrieving documents, including compound
documents, each of the compound documents including at least two different multimedia
components, each multimedia component having data of one of a plurality of multimedia
data types, the method comprising:

receiving a compound query including at least one non-textual multimedia query
component;

processing the compound query to generate a query structure comprising a set of
tokens, including at least one token representing a non-textual multimedia data type;
and

evaluating the query structure with respect to a multimedia index to selectively
retrieve compound documents that satisfy the compound query, each retrieved compound
document including data represented by at least one token generated from the compound
query.

42. The method of claim 30, wherein the multimedia index includes position
information, and evaluating the query structure comprising:

evaluating the query structure with respect to the multimedia index a first time to
selectively retrieve candidate documents that satisfy the compound query by
determining a document score for each of a number of documents based only on a
presence or absence of tokens from the query structure in the document, and selecting
a number of best scoring documents as the candidate documents; and

evaluating the query structure with respect to the multimedia index a second nine by
computing a final document score of each candidate document as a function of the
position of each token from the query structure in the candidate document, using the
position information from the multimedia index.

44. The method of claim 30, wherein:

the multimedia index comprises tokens indexed to a list of documents and reference
data associated with each listed document; and

wherein processing the compound query comprises:

determining reference data for at least one of the generated tokens of the query
structure; and

including the reference data in the query structure; and

wherein evaluating the query structure comprises:

evaluating the query structure with respect to the multimedia index a first time to
selectively retrieve candidate documents that satisfy the compound query by
determining a document score for each of a number of documents based only on a
presence or absence of tokens from the query structure in the document, and selecting
a number of best scoring documents as the candidate documents; and

evaluating the query structure with respect to the multimedia index a second time by
computing a final document score of each candidate document based on a comparison of
the reference data in the query structure with the reference data in the multimedia
index.

46. A computer implemented method for retrieving documents, including compound
documents containing both text and at least one image, each image having a
predetermined position within the document, the method comprising:

receiving a compound query including text and at least one image;

processing the compound query to generate a query structure including at least one token representing the text, at least one token representing the image, and at least one search operator defining a logical or proximity relationship between the text and the image; and

evaluating the query structure with respect to a multimedia index to selectively retrieve compound documents that satisfy the compound query, the multimedia index comprising a plurality of tokens representing texts and images, each of the tokens representing text associated with a text string, each of the tokens representing an image associated with an image feature and with reference data specifying at least a position of the image represented by the token within at least one compound document including the image, each token indexed to a list of documents including the data represented by the token.

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DOCUMENT-IDENTIFIER: US 5751286 A
TITLE: Image query system and method

US PATENT NO. (1):
5751286

Abstract Text (1):
Images in an image database are searched in response to queries which include the
visual characteristics of the images such as colors, textures, shapes, and sizes, as
well as by textual tags appended to the images. Queries are constructed in an image
query construction area in response to values of representations of the visual
characteristics and to locations of the representations in the image query
construction area.

Detailed Description Text (23):
In the first embodiment of the invention, four selection windows (containers) are
employed: a color container 91, a texture container 92, a shape container 93, and a
category container 94. The containers 91, 92 and 93 correspond to characteristics
which are innate in an image and which can be calculated as described above from image
content. The category characteristic is an arbitrary textual tag which can be appended
to an image or an image mask. Each of the selection containers 91-94 contains one or
more icons, which are referred to, preferably, as "thumbnails". Each thumbnail in one
of the image characteristic containers 91, 92 and 93 corresponds to a prespecified
value for an image characteristic. For example, the "RED" thumbnail 96 in the color
selection container 91 corresponds to a precalculated value for red taking into
account all the components of a particular display scheme which contribute to the
particular shade of red given by the thumbnail 96. In the texture selection container
92, the "GRASS" thumbnail 97 corresponds to a set of precalculated textural values. In
the shape selection container 93, the "TRIANGLE" thumbnail 98 corresponds to a
quantized representation of a triangle.

Detailed Description Text (30):
A context dialogue box illustrated in FIG. 7 is displayed when the cursor is placed on
a thumbnail and a preselected mouse button is clicked. The context dialogue box
provides two control bars for setting, respectively, distance and weight of the
thumbnail. Preferably, the setting of the distance control thresholds the value of the
thumbnail characteristic. indicating how close the value must be to the value of a
mask characteristic in order to include the characteristic in a query calculation. The
setting of the weight control determines the weighting factor for this characteristic.
Manifestly, the adjustment of thumbnail values for multiple thumbnails can establish a
relative weighting among thumbnail values for query construction. For example,
suppose, in the "BEAR" and "WATER" example described above. a user is very interested
in image color but less interested in the texture of images. In this case, the user
would increase the color attribute, but lighten the weight of texture.

Detailed Description Text (36):
FIGS. 10A and 10B comprise a flow chart describing a process for practicing the first
embodiment of the invention. In FIG. 10A, the process is initiated in step 210 by
displaying an example image window such as the window 90 illustrated in FIG. 5. A
query-by-image content procedure is initiated in step 211 by, for example, selecting
the query button 89 in the example image window 90, which issues a RUN QUERY command.
In step 212. selection windows are selected and displayed using the view pulldown
illustrated in FIG. 8B. Thumbnails are then dragged from selection windows and dropped

in the example image window in step 213. For as long the RUN QUERY command is not selected, the negative exit is taken from decision 214 and the sample image being constructed in the example image window can be edited or added to in step 213. When the RUN QUERY command is selected, the positive exit is taken from decision 214 and, for each image in the database, the procedure executes a sequence of steps beginning with decision 216 and ending with step 225. Recall that selection of the RUN QUERY command sends a set of data structures describing objects in the sample image to the QBIC function. Each object data structure is inspected to determine whether the object includes a category thumbnail. If so, the positive exit is taken from decision 216 and the masks in the current image are filtered by the category code in the data structure in step 217. The decision 216 then establishes the set of masks of the current image which will be analyzed for composite distance with respect to the image characteristic values returned in the data structure for this object. The set of masks established in the decision step 216 are then subjected to the composite distance calculations as described above with reference to equations (1)-(3). In step 218, the layout option is inspected. If enabled. the composite distance calculations for each mask are thresholded by mask/object distance in step 220. In step 222, taking account of the outcome of decision 218, composite distances between objects of the sample image and the filtered and thresholded masks of the current image are calculated using the weight, distance, and thumbnail values return for the object in step 222. Next, in step 224, the composite distance for the image is calculated. If the image is not the last in the set of images, the negative exit is taken from step 225 and the composite distance for the next image is calculated as just described. Otherwise, the positive exit is taken in step 225, the images are ranked according to the results of the composite distance calculations in step 227 and the result of the ranking are displayed in step 228.

Current US Cross Reference Classification (5):
382/305

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End of Result Set

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L19: Entry 1 of 1　　　　　　　　　File: USPT　　　　　　　　Jun 5, 2001

DOCUMENT-IDENTIFIER: US 6243713 B1
TITLE: Multimedia document retrieval by application of multimedia queries to a unified index of multimedia data for a plurality of multimedia data types

US PATENT NO. (1):
6243713

Detailed Description Text (4):
The inputs to the indexing pipeline 192 are multimedia, or compound documents containing various types of multimedia components (though of course the present invention may be used to index documents that have only text, as well as images, videos, or audio recordings by themselves). A compound document may be structured in one of two ways: 1) the multimedia components are specified by reference, or; 2) the multimedia components are embedded directly in the data of the document. An example of the first structure are HTML documents, which incorporate external files by reference.

For example, an image may be incorporated with the HTML tag [image], such as in [image].

Detailed Description Text (28):
As an example of component tags, in an RTF document image components start with

"{.backslash.pict" and end with "}". In HTML documents, images start with "[image]".
Searching 504, 506 for component tags may involve recognizing tags regardless of embedded spaces or mixed upper/lower case.

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End of Result Set

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L22: Entry 1 of 1   File: USPT   Jul 27, 1999

DOCUMENT-IDENTIFIER: US 5930783 A
TITLE: Semantic and cognition based image retrieval

Abstract Text (1):
A computer implemented method for searching and retrieving images contained within a
database of images in which both semantic and cognitive methodologies are utilized.
The method accepts a semantic and cognitive description of an image to be searched
from a user, and successively refines the search utilizing semantic and cognitive
methodologies and then ranking the results for presentation to the user.

Brief Summary Text (2):
The present invention relates generally to the field of databases and in particular to
a method and system for retrieving images contained within a database using both
semantic expressions and image examples.

Detailed Description Text (133):
Those skilled in the art will quickly appreciate that SEMCOG may support a variety of
interfaces. One such interface is shown in FIG. 10 where an HTML-based user interface
is used for the main menu of image queries. Users can use this interface to specify
CSQL directly. The windows for input sketches and specifying images will pop up by
pressing familiar buttons or other controls. In a similar manner, FIG. 11 shows the
interfaces implemented using Java for input sketches. FIG. 12 show the interface for
input images by specifying the file path.

Current US Original Classification (1):
707/1

Current US Cross Reference Classification (2):
707/104.1

Current US Cross Reference Classification (3):
707/3

CLAIMS:

1. A method of searching a database of images and retrieving at least one image
contained in said database of images, comprising the steps of:

i) generating a first set of images which match a semantic criteria of the at least
one image to be retrieved;

ii) generating a second set of images from the first set of images, which match a
cognition criteria of the at least one image to be retrieved;

iii) generating a third set of images from the second set of images, which match a
scene criteria of the at least one image to be retrieved;

iv) ranking the third set of images based on similarity to the semantic criteria and
the cognition criteria of the at least one image to be retrieved into a set of
results; and

v) presenting the user with the set of results.

22. A method of searching a database of <u>images and retrieving at least one image</u> contained in said database of images, comprising the steps of:

i) generating a first set of images which match a semantics criteria of the at least one image to be retrieved;

ii) generating a second set of images from said first set of images which match a cognition criteria of the at least one image to be retrieved and;

iii) providing said at least one image contained in said database of images to a user.

23. The method of claim 22, further comprising the step of <u>retrieving a third set of images</u> from said second set of images which match a scene criteria of the at least one image to be retrieved, prior to providing said at least one image to said user.

27. A method of searching a database of <u>images and retrieving at least one image</u> contained in said database of images, comprising the steps of:

i) generating a set of resulting images matching a semantics-based criteria and a cognition-based criteria of said at least one image to be retrieved from said database of images; and

ii) presenting said set of resulting images to a user.